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NOTES FOR STUDENTS.

W. A. WHEELER⁸ has published an ecological account of the vegetation of southeastern Minnesota in connection with a list of the species collected there. The paper is accompanied by several excellent heliotypes.—H. C. COWLES.

E. M. WILCOX has investigated⁹ a rhizomorphic root-rot of fruit trees that is doing great damage to the peach, apple, and cherry trees of the southwest. The fungus concerned is described as a new species, *Clitocybe parasitica*, and is also found infesting oak trees. A very extensive bibliography and several plates accompany the report.—H. C. COWLES.

CORRENS has shown experimentally¹⁰ that in *Mirabilis Jalapa* only one pollen grain out of five, and two ovules out of three, are fit, while in *Mirabilis longiflora* one pollen grain out of four, and one ovule out of two are fit. Therefore the chances of fertilization increase with the number of pollen grains used in pollination, and the progeny are stronger.—C. R. B.

IN A RECENT number of Engler's yearbook¹¹ there is an account of the recent attempts to secure a uniform nomenclature in plant geography. Warburg's address before the Berlin geographical congress in September 1899 is given, as is also the resolution passed by the Paris botanical congress in 1900. Engler makes an appeal for contributions that will tend to clarify the various questions, offering to publish them in the yearbook. Particularly with reference to the use of the word "formation" is there need of a general understanding.—H. C. COWLES.

VON SCHRENK has published a preliminary report on diseases of New England conifers¹² which contains a good deal of interesting material. General remarks are made on the conditions in the New England forests, and on the relation of fungi to forest problems. Several fungi, mainly Polypori, are described with especial reference to the mode of occurrence and the effect on the tree. A number of excellent plates accompany the report. Dr. von Schrenk's work has often been noticed in this journal, and must be highly commended both for its botanical importance and its practical aspect.—H. C. COWLES.

IN A SHORT paper entitled "A contribution to the natural history of marl, C. A. Davis¹³ shows conclusively that water plants, especially *Chara*

⁸ Minn. Bot. Studies, ser. 2, pt. 4. 1900.

⁹ Bull. 49, Oklahoma Agric. Ex. Sta. 1901.

¹⁰ Berichte d. deutsch. bot. Gesells. 18: 422-435. 1900.

¹¹ Eng. Bot. Jahrb. 29: Beiblatt 66, 23-30. 1900.

¹² Bull. 25, U. S. Dept. of Agric. Div. of Veg. Phys. and Path. 1900.

¹³ Jour. Geol. 8: 485-497. 1900.

and blue-green algae, are of great importance in marl formation. The calcareous incrustations, which give rise to marl upon the decay of the plants, are formed by the deposition of CaCO_3 when the CO_2 , which caused it to remain in solution, is used in photosynthesis. The oxygen set free in photosynthesis also causes the precipitation of CaCO_3 . One interesting fact brought out by the study is that plants vary widely in respect to the incrustations, indicating selective processes not yet understood.—H. C. COWLES.

MISS ELIZABETH DALE, in a communication to the Royal Society, London, through Professor H. Marshall Ward, shows that the abnormal outgrowths, or intumescences, in *Hibiscus vitifolius* Linn. are due to pathological conditions, being formed in a moist atmosphere, provided there is also adequate light and heat. The immediate effect of the damp atmosphere is to check transpiration. This, in its turn, by blocking the tissues with water, disturbs the normal course of metabolism, and so leads (when the light and heat are sufficient) to abnormal development of certain regions. The formation of these outgrowths is accompanied by the production of oil, which is not found in normal leaves. Its presence suggests that events similar to those occurring in succulent plants are taking place, viz., reduced respiration and the development of osmotically active substances in excess. It is therefore probable that the intumescences are due to the local accumulation of osmotically active substances, produced under the abnormal conditions.—H. M. WARD.

THE LITERATURE of the first mitosis of the spore mother cell of *Lilium* shows a wide divergence of opinion in regard to the phenomena involved, but there are certain stages which have been constantly observed. How these stages are derived from one another is the most debated question. In a recent paper Professor Dixon¹⁴ figures and describes six well ascertained stages, and then proceeds into the debated territory. Nearly all observers describe a longitudinal splitting of the entire thread just before the segmentation into chromosomes, but Professor Dixon believes that the stage so constantly observed arises from the looping on each other and approximations of two portions of the thread. Several very suggestive objections are urged against the commonly accepted interpretation. Although believing that each of the two twisted portions undergoes a longitudinal splitting while still in the spirem stage or immediately after differentiation into chromosomes, regarded as a second longitudinal splitting by Guignard and others, the author believes that this is the first and only longitudinal splitting. A series of very clear diagrams illustrates the author's interpretation of the composition of the chromosomes and their behavior during the later phases

¹⁴ On the first mitosis of the spore mother cells of *Lilium*. Notes from the Botanical School of Trinity College Dublin 4: 129-139. *pls.* 7-8. 1901.

of mitosis. According to this interpretation there is no qualitative reduction during the first division of the spore mother cell.—CHARLES J. CHAMBERLAIN.

THE LIFE HISTORY of *Schizaea pusilla* has been investigated recently, and the results form the first fairly complete account of this interesting fern.¹⁵ The material was collected at Forked river, New Jersey, in July 1900. Sections do not seem to have been made except in the study of the root, stem, and leaf. While the peculiar gametophyte and the general aspect of the young sporophyte are shown more clearly without sections, one cannot help feeling that the account of the development of the antheridia and archegonia, and also of the very young sporophyte, would have been more satisfactory if the study had been made from microtome sections. The gametophyte is composed of numerous erect branching filaments which have a somewhat uniform diameter and bear a striking resemblance to the protonema of a moss. The filaments persist until the young sporophyte has attained considerable size. The archegonia are not imbedded, but are entirely free, in general appearance suggesting the archegonia of certain liverworts. The archegonium originates as a single superficial cell which gives rise to a row of three cells. From the outermost of these is formed a neck consisting of four tiers of cells with four cells in each tier. From the middle cell comes the central cell which gives rise to the neck canal cell, the ventral canal cell, and the egg. The basal cell forms the venter. One figure illustrating the development of the antheridium shows a row of three cells. The outermost cell "becomes large and globular and cuts off a cap cell at the summit, with the wall oblique. The large cell divides up into the mother cells of the antherozoids and one ring cell." The anatomy of the root, stem, and leaf is described in detail.—CHARLES J. CHAMBERLAIN.

DR. A. KLETT¹⁶ has recently studied anthrax to ascertain if it is possible to produce the spores in a culture of the bacillus grown under artificial anaerobic conditions, and to observe the effect of nitrogen and hydrogen upon the growth of the colonies. For the nitrogen experiments Buchner's tubes containing pyrogallic acid and caustic potash were used. By this means the oxygen and carbon dioxid of the atmosphere in the sealed tubes were absorbed, leaving nothing but nitrogen. For the hydrogen experiments he employed Kipp's apparatus for generating the hydrogen, and Botkin's apparatus for growing the cultures in plates and in liquid media. Although every precaution was taken against the possibility of error, Klett shows by careful experimentation that spore formation in anthrax is independent of the presence of oxygen. He was enabled to obtain a rich growth of the bacillus with

¹⁵ BRITTON, ELIZABETH G. and TAYLOR, ALEXANDRIA: The life history of *Schizaea pusilla*. Bull. Torr. Bot. Club **28**: 1-19. pls. 1-6. 1901.

¹⁶ Die Sporenbildungen des Miltzbrandes bei Anaërobiëse. Zeit. f. Hyg. u. Infectiouskrank. **35**: 420. 1900.

abundant spores in an atmosphere of nitrogen. In the hydrogen atmosphere, on the other hand, there appeared only a very meager growth of the colonies, without a trace of spores. From these observations Klett opposes the more commonly accepted view that the presence of free oxygen is a necessary condition for the formation of spores in the anthrax bacillus, and holds that spores cannot be formed in an atmosphere of hydrogen owing to the retarding effect of this gas upon the growth of the colonies. He further concludes that it is not the presence or absence of oxygen that determines the growth and the development of spores in the bacillus, but that every gas has its specific influence in this respect. The paper is a most interesting and valuable contribution to the controversy of spore formation in anthrax, and it also has an important bearing on many experiments where hydrogen, considered as an inert gas, has been employed to bring about an anaerobic condition.—A. A. LAWSON.

ITEMS OF TAXONOMIC INTEREST are as follows: L. DIELS (Engler's Bot. Jahrb. 29: 577-659. 1901) has completed his account of the flora of central China, the closing part extending from Bignoniaceae to Compositae. Besides numerous new species, *Kolkwitzia* (Caprifoliaceae) and *Hoeckia* (Valerianaceae) are described by Graebner as new genera.—O. E. SCHULZ (*idem* 660-735. *pls.* 6-8) has published a monograph of *Melilotus*. A discussion of the history, morphology, teratology, biology, and geographical distribution of the genus is followed by a detailed presentation of the twenty-two recognized species, three of which are new.—S. SOMMIER and E. LEVIER (*Acta Horti Petropolitani* 16: 1-586. *pls.* 1-49. 1900) have published an elaborate account of the plants collected in the Caucasus in 1890, illustrated by forty-nine fine lithographic plates. The list includes cryptogams as well as seed plants. More than a hundred new species are described, and still more numerous new varieties.—W. LIPSKY (*idem* 18: 1-146. 1900), in a contribution to the flora of middle Asia, has described numerous new species, and with them two new genera of Umbelliferae, *Korshinskia* and *Galagania*.—N. L. BRITTON (*Torreya* 1: 21. 1901) has described a new *Senecio* (*S. Crawfordii*) from Pennsylvania.—M. L. FERNALD (*Rhodora* 3: 43-56. 1901) has published a synopsis of the northeastern species of *Carex* of the subsection *Vesicariae*, recognizing eleven somewhat polymorphic species and describing seven new varieties.—F. LAMSON-SCRIBNER (*Div. Agrost. Circ.* 30. 8 Mr 1901) has described new species of *Ichnanthus*, *Agrostis*, *Bouteloua* (2), and *Danthonia*, besides numerous new varieties and combinations.—E. L. MORRIS (*Bull. Torr. Bot. Club* 28: 112-122. *pl.* 12. 1901), in his second paper on N. Am. Plantaginaceae, has described six new species of *Plantago*.—G. N. BEST (*idem* 123-131. *pls.* 13-14), in a revision of the N. Am. Species of *Heterocladium*, recognizes six species and varieties, three of which are described as new.—J. M. C.